Labs Director signs annual assessment letter

In late September, Sandia President and Laboratories Director Steve Younger signed Sandia's annual assessment letter. Each year, Sandia assesses the safety, reliability and performance aspects of the nation's nuclear weapons stockpile for which it has responsibility. Through a series of formal presentations and discussions involving all stockpile weapon systems and support organizations, the chief engineer for nuclear weapons and the deputy laboratories director for national security programs report on the safety, reliability and performance status of the stockpile in the absence of nuclear testing. As required by law, the Labs director provides an annual summary of this assessment and related issues to the secretaries of energy and defense and the chairman of the Nuclear Weapons Council. The directors of Los Alamos and Lawrence Livermore national laboratories and the commander of the United States Strategic Command complete similar letters based on their assessments. The secretaries, in turn, attach each assessment without change and submit a letter to the president under their signatures detailing their comments, conclusions and other appropriate information about the state of the nation's nuclear deterrent. — Troy Rummler

(Photo by Lonnie Anderson)

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Rick Perry thanks employees for national service

ALL HANDS — Energy Secretary Rick Perry, with Sandia President and Labs Director Steve Younger, addresses a full house at an all-hands meeting in the Steve Schiff Auditorium at Sandia on Tuesday afternoon. (Photo by Randy Montoya)

By Troy Rummler ***Photos by Randy Montoya***

Energy Secretary Rick Perry emphatically thanked Sandia employees for their contributions to science and issues of national and international security, equating research to public service during a visit to the Labs on Oct. 9.

"There's an old saying that the United States Marines don't have to look in the mirror and ask themselves if they make a difference," said Perry during an all-hands meeting. "I suggest the same thing's true for men and women of our national labs, particularly those that work in the weapons programs."

Sandia welcomed Secretary Perry for a tour of the Albuquerque facilities as part of his commitment to visit each DOE national lab. The morning tour included visits to MESA and Z machine, and meetings with labs leadership. Following, Perry led an uncommonly easy-going all-hands meeting, featuring a comfortable-looking secretary telling frequent jokes and stories on stage. Secretary Perry visited Sandia's California site in March.

SPARKING INNOVATION — Keith Matzen, director of the Pulsed Power Sciences Center, Energy Secretary Rick Perry and physicist Jim Bailey discuss the research of the Z machine during a stop at the Sandia facility on Tuesday. (Photo by Randy Montoya)

Six join ranks of Labs Fellows

Director's appointments bring total to 15 in Sandia's history

By Neal Singer

Sandia has appointed six technically outstanding researchers to the extraordinary position of Fellow. The new appointees, from a wide variety of backgrounds, include the first female Sandia Fellow, Katherine Hansen Simonson, and the first Hispanic Sandia Fellow, Gil Herrera.

In announcing the Fellows, Labs Director Steve Younger wrote, "Appointment as a Sandia Fellow recognizes a career of significant accomplishment for the Labs and for the nation. I am asking each Fellow, new and existing, to take a greater role in informing strategic directions at the Labs.

Steve continued, "I would also ask that they serve as ambassadors for the Labs to organizations such as the Department of Energy, other government agencies, academia and technical societies. With their wealth of experience and knowledge, they are well suited as trusted advisors on a wide range of technical topics."

Said Grant Heffelfinger, deputy Labs chief research officer, "The Fellow appointment is not solely an honorific, but a position with responsibilities for people of technical accomplishment and a track record of impact."

Candidates are initially selected based on input from the technical divisions. Submitted forms are reviewed by a high-level panel led by Susan Seestrom, chief research officer and associate labs director for advanced science and technology. Those who make it through the winnowing process are interviewed by Steve, on whose shoulders rest the final decisions.

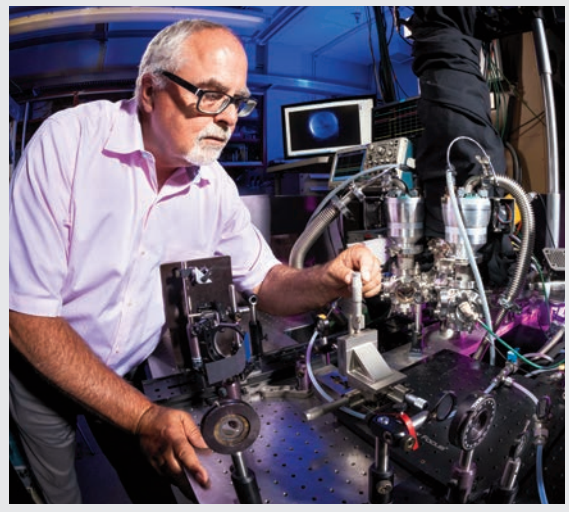
Previous to the six appointments, Sandia has named only nine Fellows in its history. Seven are retired: Jerry Simmons, Jim Gosler, Gordon Osbourn, John Rowe, Gus Simmons, Wendell Weart and Walt Herrmann. Those who continue to serve as Sandia Fellows are Jeff Brinker and Ed Cole.

An on-site reception is planned where colleagues can visit with the new Fellows. Also planned is a private dinner for the Fellows and their immediate families with senior management.

The newly appointed fellows are:

David Chandler

Dave is an internationally renowned gas phase physical chemist. He is a fellow of the American Physical Society and has been elected by his peers as chairman of the society's division of chemical physics. He has published over 120 refereed articles with more than 4,000 citations.



DAVID CHANDLER

Dave's father, William H. Chandler, was a longtime Sandia employee, and Dave grew up swimming in the Coronado Club pool, which then was on the Labs campus. He was awarded a gymnastics scholarship to the University of New Mexico,

(Continued on page 4)

Raising the visibility of women in computational mechanics

By Rekha Rao, chemical engineer, Engineering Sciences Center

I started my professional career at Sandia in 1990, during a hiring freeze, when less than 15 percent of the engineers were women. Because I was young and female, no one believed I was an engineer. I often felt that I had to prove myself smart and capable, while male engineers were assumed to be competent simply by virtue of being male. As a code developer for computational mechanics, I would often find myself the only woman on the team, the only woman in the department or the only woman at a seminar. I worked hard to raise my hand and have my voice heard.

Computational mechanics is a multidisciplinary approach to solving problems that draws on ideas from mechanics, physics, engineering, mathematics and computer science. This summer I took part in an inspiring event — a far cry from my experience of being the only woman in the room — at a computational mechanics conference. I was in a room surrounded by more than 60 women, from graduate students to full professors, all of whom were experts in computational mechanics. What I learned from my colleagues who took part in the World Congress of Computational Mechanics in New York has led me to think more deeply about how we support and mentor researchers in all fields at Sandia, but especially women and minorities.

INSPIRING PERSPECTIVE — More than 50 women gathered for a networking event at the world Congress of Computational Mechanics.

I'm the chair of the Female Researchers Chapter of the International Association of Computational Mechanics, which works to support and encourage women in the field. At WCCM, we organized a women's networking event with the 60 women I mentioned, and I was able to speak to many of them personally and get a perspective on their lives, their research and their career development goals. I immediately realized that I wanted to tell the Sandia community about what I learned in the hope that we can all apply more of our energy to helping female researchers reach their full potential.

Professor Antonio Huerta, IACM president, opened the event with a plea to women to apply for committee memberships and other leadership positions. The focus of the event was a mentoring session with a panel featuring five accomplished women from a broad and diverse range of backgrounds, expertise and career paths. Panelists told their stories and discussed issues facing them as their career grew, how they balanced career and family, and the challenges that face women in leadership positions.

The panel's honesty and willingness to openly share their stories was truly inspirational. We heard about how to successfully manage pregnancy and childcare during the tenure process, about the typical two-body problems and the sacrifices that some had to make to have two careers in one family, and about how to prioritize projects and reporting to support work-life balance. The panel also discussed the evolution of training topics such as inclusion and sexual harassment in corporate culture.

We learned that this generation of women has faced fewer challenges than those faced by the previous generation, which had broken a lot of ground. Overt harassment and company-sponsored sexist behavior is mostly a thing of the past, though women are still less visible than men and still must work harder for advancement.

Observing that all of the panelists had children, a graduate student from the audience shared that in Germany she felt discouraged from becoming a mother if she wanted a successful academic career. Seeing five successful mothers made her realize that it is possible to balance career and family especially if, as the panel advised, women sought support from family, nannies, spouses, cleaning services and online stores that deliver. The fact that women still take on more of the childcare and household responsibilities than men means that women must seek creative solutions to managing household and career responsibilities.

The panel included Veena Tikare, a computational materials scientist from Sandia; Lucy Zhang, a mechanical engineer at Rensselaer Polytechnic Institute; Carol Featherston from Mechanics and Aerospace Engineering at Cardiff University in the U.K.; Dora Foti, a structural engineer at Politecnico di Bari, in Italy; and Alison Marsden, professor of pediatrics and bioengineering at Stanford University. Ruth Hengst, IACM conference coordinator, and Carrie Christensen of Elsevier, which sponsored the event, greatly contributed to its success.

Some of the discussants brought up the lack of women in prominent roles with the IACM. My group, the Female Researchers Chapter, works hard to suggest more diverse and varied speakers to meeting organizers and identifies outstanding female leaders to take on more prominent roles, but we need the entire community to work as hard as we do to promote gender equity. Learning about our group inspired WCCM organizer Jacob Fish of Columbia University to add four female visionary speakers, as well as two semi-plenary women researchers.

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Lab News Notes

Editor's Note: Lab News seeks guest columnists with observations on life at the Labs or on science and technology in the news and in contemporary life. If you have a column (500-750 words) or an idea to submit, please contact Jim Danneskiold, the acting editor.

Several women commented that this was one of the best mentoring events they had attended because, as Veena Tikare said, "it gave practical, actionable examples of how to manage the professional, cultural and familial demands that women face."

Sandia chemical engineer Rekha Rao (Photo courtesy of Rekha Rao)

As for me, I came away with the firm conviction that, indeed, research societies across all the scientific and engineering disciplines must come together to address these issues and provide opportunities for promising female researchers. We were able to provide travel fellowships to the world congress for eight women — two each from Brazil and India and others from Japan, Israel, Italy and the U.K. — thanks to donations from MSC Software, CIMSoft and GoEngineer. These awards helped graduate students and postdocs attend the meeting and further their careers in computational mechanics.

Just as the larger research community needs to take an active role in supporting gender equity, the various research communities at Sandia and men and women in management roles must examine how they can ensure rich and fulfilling careers for female researchers at the Labs. After all, attracting and retaining talented women can only support Sandia's mission success by providing a larger talent pool and diverse viewpoints.

Nominate colleagues for Employee Recognition Awards, Oct. 15-31

By Myles Copeland

Last fall, Ashley Allen, a technologist in the power sources group, went into her office, glanced at her phone and immediately felt sick.

"I came back from the lab and I had a missed call from (Labs Director) Steve Younger," said Ashley, describing the nerve-rattling scene. "I was thinking, 'Oh my God. Something's wrong.'"

Everything, it turned out, was just right. Steve's call was congratulatory, informing Ashley she had won the first Labs Director's Award as part of Sandia's 2017 Employee Recognition Awards.

"When we finally connected, it was really nice to get that personal touch," said Ashley, who was recognized for her leadership in enabling the transition of battery technologies to partner organizations. "He congratulated me on the project, and he talked about it in detail. He knew what I had done."

With the 2018 ERAs, Sandia employees again have an opportunity to spotlight their colleagues' achievements. Team and individual nominations will be accepted Oct. 15-31, at hr.sandia.gov. Celebrating exceptional accomplishments between May 1, 2017, and Sept. 30, 2018, this year's ERAs feature six categories: safety and security, quality, collaboration, efficiency, technical and leadership. Winners will be announced in January and invited to attend ERA events.

As nice as it was to be recognized by the Labs Director, Ashley was heartened to be nominated by the staff member she supports.

"The recognition from my staff member alone — I was so grateful just to know that they recognized how hard I worked," Ashley said. "That meant a lot to me."

INAUGURAL ERA WINNER — Ashley Allen received the first Labs Director's Award from Steve Younger during last year's awards.

(Photo by Lonny Anderson)

Sandia helps girls develop a taste for STEM subjects

Story and photos by Jules Bernstein

Sandia biochemist Carolyn Fisher designed and organized what was perhaps the tastiest workshop at a recent conference for middle and high school-age girls.

The 2018 San Joaquin Expanding Your Horizons conference assembled 550 girls in the 6th through 12th grades to encourage interest in science, technology, engineering and math. The girls came from nearby San Joaquin and Stanislaus counties on Sept. 22 to the University of the Pacific in Stockton, California.

By guiding the girls through an experiment with a special fruit, Carolyn and her team of volunteer workshop leaders taught the girls not only about the biochemistry responsible for the taste of food, but also about using scientific approaches to understanding natural phenomenon.

The fruit in question is a "miracle berry," or, Synsepalum dulcificum, a West African fruit so named for its ability to make sour or bitter foods taste sweet. The effect only lasts for a short time, and only with foods that are acidic. During the workshop, the girls tried a variety of foods both before and after trying the miracle berry, recorded the data from their tastings, and were asked to form a hypothesis about the taste data they collected.

Students worked through the scientific method to better understand how the miracle berry changed the way they perceived taste, changing a lemon, for example, into something that tasted like candy.

"Our 'Reverse Your Tastebuds' workshop is a demonstration of protein-ligand interactions and signal transduction pathways that we rely on every day for sensory perception," Carolyn said. "In other words, we showed them a little about the science behind their senses and hopefully got them excited to learn more. These basic biochemical principles are integral to chemical and biothreat characterization, an important part of Sandia's biodefense mission."

Carolyn has participated in EHY conferences since 2012, and Raga Krishnakumar of Systems Biology is also a veteran volunteer. Several others on Carolyn's crew were first-time EYH volunteers, including postdoctoral fellow Catherine Mageeney, Pam Lane and Frances Carcellar, all of Systems Biology, along with this reporter. The experience was overwhelmingly positive for all.

"Growing up, I remember looking up to women excelling in a variety of fields — biology, physics and engineering — with a sense of awestruck wonder. Getting to play that role for the younger generation now is awesome," Frances said. "Seeing the girls' raw curiosity and enthusiasm revitalizes how I see my own work."

Conference-goers attended a total of three workshops throughout the day that featured hands-on STEM-related activities. In addition to the taste bud workshop, offerings included: making a battery using oranges and lemons to power an LCD display, dismantling and rebuilding a working computer, and programming a LEGO robot for eventual battle in a robot war.

Rounding out the day, the girls were treated to a keynote speech by Candice Gellner, a technology transfer executive at Lawrence Livermore National Laboratory. Gellner has a background in biomedical research. She spoke to the girls about the anxieties she felt in her early days of studying chemical engineering, and the great professor she had who helped her overcome her fears.

Sandia, Lawrence Livermore and the University of the Pacific's School of Engineering and Computer Science are the organizing sponsors of this annual conference in Stockton. EHY Stockton is part of the EYH Network, a national program based in Oakland. Conferences also happen throughout the year in other cities.

To volunteer for future EYH conferences, contact Cary Gellner at gellner1@llnl.gov.

TASTE TEST — Frances Carcellar breaks down the biochemistry of taste.

MAKING SENSE — Catherine Mageeney teaches EYH conference attendees about why humans perceive taste.

SWEET SCIENCE — Carolyn Fisher addresses a budding group of taste experimenters at the EYH conference.

Sandia Exceptional service in the national interest **CaliforniaNews**

Jackie Chen elected fellow of the American Physical Society

By Michael Padilla

HALL OF FAMER — Jackie Chen, a distinguished member of the technical staff at Sandia, was inducted into the Alameda County Women's Hall of Fame in 2016. (Photo courtesy of Alameda County Women's Hall of Fame)

Jackie Chen has been elected a fellow of the American Physical Society.

This honor is afforded each year to no more than one-half percent of the members of the society.

Jackie was honored "for fundamental insights into turbulence-chemistry interactions revealed through massively parallel direct numerical simulations."

"Being named a fellow of the American Physical Society is a great honor," Jackie said. "This recognition represents my commitment to understanding computational simulation of turbulent reacting flows with complex chemistry."

Jackie, who has spent her entire career working at Sandia's world-renowned Combustion Research Facility, conducts research on the understanding of the complex interactions of fluid flow and chemistry in flames. Her research has involved some of the largest computational simulations ever performed, using some of the world's largest supercomputers.

Jackie has been elected to the most prominent advisory panels in the nation associated with both combustion and scientific computing research.

She was recently recognized with an Achievement Award from the Society of Women Engineers for her impact on the engineering community and the society. She was inducted to the National Academy of Engineering in September. She also was named fellow of The Combustion Institute earlier this year. She has published more than 154 papers, mostly in top research journals.

Jackie's research has focused on explaining how combustion works, using a unique computer code she developed to calculate the properties of turbulent fluid flow and flames. This code scales effortlessly across the hundreds of thousands of processors in supercomputers. Jackie has devoted her career to a type of calculation called direct numerical simulation. The simulation is the most accurate approach possible for modeling flames and turbulent flows because it fully resolves all relevant spatial and temporal scales of the flow and its associated chemical reactions.

The American Physical Society represents more than 50,000 physicists in academia, national laboratories and industry worldwide. Its fellowship program recognizes members who have made exceptional contributions to the physics enterprise, including outstanding physics research, important applications of physics, leadership in or service to physics or significant contributions to physics education.

"On behalf of the APS, I'm pleased to congratulate all [the society] members who have been recognized by their peers through their selection as 2018 APS Fellows," said APS Chief Executive Officer Kate Kirby.

COOL FLAMES — Sandia researchers Giulio Borghesi, left, Jackie Chen, center, and Alex Krisman discuss a flame simulation. (Photo by Dino Vournas)

Labs fellows

(Continued from page 1)

received a bachelor's and doctorate in chemistry from Indiana University, went to Stanford University for post-doctoral work and joined Sandia in Livermore in 1982. There, he said, he was awarded the last lab available at the Combustion Research Facility.

His research has focused on photochemistry of small organic molecules to understand bond energies and energy transfer in small molecules. He designed and built a new type of apparatus that measured the speed of slowly moving charged particles.

"Since one can easily turn a neutral atom or molecule into a charged particle by exposing it to light of sufficient energy to eject an electron in this new technique, it also measured the velocity of neutral particles," Dave explained.

The technique, called ion imaging, has become the standard for measuring velocity in many chemical reactions. The invention earned him the Herbert P. Broaida award from the American Physical Society. More than a hundred groups around the world now use some variant of this technique.

In his spare time, Dave helped some friends start an educational toy company. "I enjoyed the fun of product development with them for many years," he said.

He writes of his plans, "As program manager for the Basic Energy Sciences, Gas Phase Chemical Physics programs at Sandia, I envision further strengthening these fundamental science programs and finding connections of this research and capabilities with other core mission areas within Sandia."

Patrick Griffin

Patrick has expanded the state of the art in radiation effects to become an acknowledged leader in the international radiation effects community. Pat developed the NuGET code, a major tool for nuclear weapon qualification, and contributed greatly to the development of the radiation qualification process.

PATRICK GRIFFIN

He grew up in Mineral Ridge, Ohio, a small town near Cleveland, achieving his bachelor's in physics and mathematics and doctorate in nuclear physics at Ohio University.

Characteristically starting from first principles, the first item on his list of important achievements is Eagle Scout.

"I am stubborn and do not like to fail," Patrick said. "The first year I went as a Boy Scout to summer camp, I had never learned to swim. I was embarrassed, being restricted to the shallow part of the lake near the dock. Following that summer, I worked hard on improving my swimming and, when I came back to Boy Scout summer camp the next year, I not only qualified as a competent swimmer with full access to the lake, but I earned the mile swim badge. "

This stubbornness enabled him to do academics his way.

"My former physical chemistry professor told me after class one day that I had driven him crazy when he graded my p-chem tests because I always got the correct answer but I did not use the expected formula, so he had to look very carefully at my work to ensure that it followed logically from accepted formulas. It did, but it flowed along a longer path and from a different set of baseline expressions than was typical. Rather than memorize a lot of formulae, I made sure that I knew the basic building blocks and then worked out the expression needed for a given application."

Patrick the student wasn't asking much: he just wanted things explained from a "first principles" standpoint.

"When my freshman year physics courses failed to get down to what I considered the true fundamentals, I stopped taking physics courses as a sophomore and concentrated on mathematics and chemistry instead. I got back into physics as a junior when the classical mechanics, electromagnetism and quantum mechanics classes finally began to address things from a fundamental standpoint. Once my studies of physics began to approach things from first principles, I had found my home. I ended up completing the classroom work for a triple major – physics, chemistry and mathematics – but I was now a physicist at heart. And, like a 2 year old, I could continue to always ask the question 'why,' but now, unlike a 2 year old, I had the tools to try to answer/probe the questions myself."

In his new role as a Sandia Fellow, he envisions working with NNSA and the Defense Threat Reduction Agency to better understand the vulnerability of the nuclear stockpile to evolving threats. He also intends to maintain strong relationships with colleagues in the Department of Defense to improve the characterization of radiation requirements, and to continue to engage with the international community to achieve a better scientific understanding of the physics behind radiation damage to materials.

He hopes to inspire young Sandia staff members to improve the description of the primary damage from neutron displacement and to provide a higher-fidelity model for neutron damage in semiconductors. Another goal is to engage Sandia's statisticians with the radiation damage community and start an internal initiative to apply a rigorous statistical approach to the understanding and quantification of radiation damage.

Gilbert Herrera

Gil has made extensive contributions to nuclear weapons and other Sandia missions for customers in DOE, NNSA, the Department of Defense and the intelligence community through his expertise in micro and nanotechnologies.

Gil was born and raised in Albuquerque, "from Northern New Mexico families who lived in the Española Valley since Oñate."

He started his undergraduate degree at the United States Military Academy but was injured playing college football. He received an honorable discharge from the Army, and continued his education at the University of New Mexico, earning his bachelor's in computer engineering and a master's in electrical engineering from the University of California, Berkeley, as a participant in Sandia's One Year on Campus Program.

Gil led the start-up of Sandia's MESA facilities, and served 8 ½ years as director there. He secured funding to sustain the Silicon Fab, and prepared the facilities for major nuclear weapon component production. His efforts included both a new approach to delivering radiation-hardened integrated circuits that saved time and money, and the first delivery of a compound semiconductor component to the nuclear stockpile.

He has been director of the Laboratory for Physical Sciences at a joint University of Maryland/U.S. Government research institute, and served at the White House Office of Science and Technology Policy as an AAAS/Sloan Fellow under President George H.W. Bush's science advisor D. Alan Bromley, where he worked on U.S. semiconductor and technology transfer policy. He has received numerous awards for his service, including three Civilian Service medals from the Pentagon and the National Security Agency Research Medallion.

GILBERT HERRERA

He is a fellow of the American Association for the Advancement of Science, a senior member of the Institute of Electrical and Electronics Engineers and a fellow of the University of Texas Institute for Advanced Technologies.

For his new station as Labs Fellow, he envisions contributing to the LDRD program and Advanced Science and Technology strategy, working with other Lab Fellows and senior scientists on issues identified by Steve and the associate labs directors.

"The main areas I envision are working with others across the laboratory on the cultural and institutional barriers that inhibit the transition of technology from research to mission application, with an emphasis on the nuclear weapon program," he said. "I also plan on continuing to work with the intelligence community on work associated with my recent assignment to NSA."

He also looks forward to mentoring: helping people who are struggling with the decision whether to pursue a management or technical career path, new employees trying to establish themselves within Sandia, people and teams working on technology transfer issues and teams formulating new research proposals.

M. Keith Matzen

Keith is a preeminent scientist, manager and leader who has shaped the future of national security through his work to develop and apply pulsed power drivers to important problems in high energy density science and inertial confinement fusion.

Keith, born and raised in Nebraska, received his bachelor's in physics and chemistry from Hastings College and his doctorate in physical chemistry (kinetic theory) from Iowa State University.

M. KEITH MATZEN

"Over the last few decades, I have had the great pleasure of working with many different teams who advanced the science and technology of generating and accurately measuring the properties of extreme states of matter in pulsed power facilities," he said. "With short pulses of very large electrical currents, the associated magnetic field pressures can drive materials to temperatures of millions of degrees Kelvin and pressures of millions of atmospheres, often called High Energy Density science or HED."

With each new generation of pulsed-power drives, the number of applications grew and now includes radiation effects science, radiation physics, fusion physics (both indirect x-ray drive and magnetic direct drive), dynamic material properties and various physics issues associated with the performance of the nuclear explosive package," Keith said.

"Collaborations with university research groups have led to fascinating progress in astrophysics (for example, physics issues in stars like our sun, white dwarf photospheres and black hole accretion disks) and planetary science (such as the physics of the structure of Earth and super-earths, Jovian planets and formation of the earth-moon system)" he continued.

By many measures, Keith said, HED science is still a young scientific field.

"Our teams at the Z facility have had phenomenal achievements with our experimental and theoretical tools, and my job for many years has been to try to provide some guidance and resources plus a research environment within which they can succeed," Keith said.

"As a laboratory Fellow, I would like to work on refining the requirements for the HED capabilities that are needed to close existing gaps in our stockpile stewardship program and support our national security and nuclear deterrence strategies." he said. "The next step is to determine how to provide these HED capabilities within the larger framework of national security science and technology requirements."

Keith is a fellow of the American Physical Society and the recipient of the Fusion Power Associates Leadership Award.

Before taking on this new role, Keith has agreed to continue to serve as director of the Pulsed Power Sciences Center until his successor is named.

William M. Miller

Bill is a physicist who has demonstrated significant breadth and depth in the performance of multiple Sandia and national-level assignments over his career. Bill's work in microelectronics reliability was groundbreaking.

Bill grew up on the West Coast, son of a Navy career veteran. Bill's degrees, all in physics, include a bachelor's from University of Washington and a master's and doctorate, both from the University of Illinois.

He writes, "When I was in sixth grade, my parents started to buy me popular technical magazines on an irregular basis. One of those, Popular Mechanics, published in April 1969, had a feature article entitled "The Super Lab That Nobody Knows" (April 1969 p. 124-127, 217), which described Sandia and its cutting-edge work," Bill recalls. "I was fascinated and read that article over and over, thinking as a child of 13 that Sandia would be a neat place to work.

(Continued on page 5)

Labs fellows

(Continued from page 4)

WILLIAM M. MILLER

"Fifteen years later, with my Ph.D. defense just months away, I started to pay close attention to recruiting posters. There was one for Sandia — the same Sandia that I had read about as a child. I signed up, interviewed, was offered a job and accepted. By the way, my recruiter, Harry Hjalmarson, is still employed here."

Katherine Hansen Simonson

Katherine has made important contributions to Sandia and the national security community in the field of statistics and data analysis. She is highly regarded in the Automatic Target Recognition and Space Mission communities and has received numerous Sandia awards, including the Laboratory Directed Research and Development Award of Excellence, various Employee Recognition Awards and Classified Inventor awards. She recently was selected to serve on the U.S. Air Force Scientific Advisory Board Federal Advisory Committee.

Katherine grew up in the Boston area and earned a bachelor's in mathematics from Middlebury College in Vermont, minoring in literature.

"Middlebury, a liberal arts college, had a strong focus on the development of writing skills, and I feel that this has served me well throughout my career," she said.

She spent her junior year at Vanderbilt University, where she took her first two courses in statistics and, she said, "fell in love with the field." She achieved her master's and doctorate at Princeton, both in statistics. Her dissertation focused on the development of data analytic techniques for application in geophysics and structural geology.

At Sandia, she's worked on automatic target recognition systems for synthetic aperture radar sensors and new techniques for advanced SAR exploitation. "Sandia and our sponsors were ahead of the times in the 1990s, but the military community has since accepted the need for automated image exploitation," she said.

She has also developed a range of mathematically rigorous data analytic techniques widely used in the near-real time detection, classification and geolocation of threat signatures, often providing orders-of-magnitude improvement over pre-existing technologies.

KATHERINE HANSEN SIMONSON

"Several of the statistical techniques that I first developed in graduate school are still regularly cited and applied in the areas of geophysics and epidemiology," she said. "My work came at just the right time, as these fields were rapidly becoming more quantitative in nature.

She looks forward to providing technical expertise and strategic guidance to Sandia programs that are focused on data analysis and exploitation, saying, "Sandia is well-positioned for a leadership role in data analytics, and I will assist in bringing this potential to fruition."

"I think that the most useful advice that I can give to Sandia's future leaders is to live outside of your comfort zone," she said. "Learn about the priorities and constraints associated with mission areas that are entirely new to you, attend research seminars that you don't expect to understand and look for opportunities to apply your knowledge and skills in unforeseen applications. Through constant exposure to a wide cross-section of technical ideas and mission needs, you can position yourself to make revolutionary contributions to Sandia and the nation."

Sandia engineer featured in golf publication

Born with one arm, Bobby Baca competes against the best of the two-handed

By Michael Baker

One-arm golfer Bobby Baca wants to be the best he can be. No, scratch that cliché, Bobby Baca wants to beat the best.

"What drives me is to be able to become as good as a top golfer that is two-handed," says the Sandia engineer. "I want to just be considered as a really good golfer."

And that he is, as illustrated by a recent feature in New Mexico Golf News, reprinted here by permission.

Bobby has been at Sandia for 27 years, the last 20 working in military systems development engineering. He has a bachelor's in civil engineering and a master's in systems engineering from New Mexico State University.

BEING THE BEST — Sandia engineer Bobby Baca has risen to the top of the one-arm golf world and now aims to compete against the two-handed best. (Photo by Randy Montoya)

To achieve his goals, Bobby knows it takes work. The right-handed golfer played 71 rounds last year despite a five-month break for a hip replacement. A procedure required, he admits, partly because he was revamping his swing. He worked on loading his weight on his left leg at address to improve his balance at impact, and the extra practice contributed to wearing out cartilage.

"Golf is peaks and valleys," he says. "You have to practice at it if you want to be good at it. You have to practice at it if you want to play against the best."

One-arm golfer perseveres

'Golf is something you can always get better at'

By Dan Vukelich
Editor of New Mexico Golf News
July 26, 2018

Bobby Baca was so close. The one-arm golfer got his handicap index down to 7.1 in June, low enough to play in the USGA's U.S. Senior Amateur Championship qualifier earlier this month at Paa-Ko Ridge Golf Club. Then disaster struck.

Baca, 55, of Albuquerque, entered the Albuquerque City Men's Golf Championship and made a mess of things over two days in early July. His handicap shot up to 7.8, above the USGA's 7.4 limit. Had he entered the Senior Am qualifier earlier and taken a pass on the city men's, he would have been allowed to play.

For the intensely goal-oriented player, who had already reached the zenith of one-arm golf competition, losing the chance to compete against able-bodied golfers in a high-level event was a huge disappointment.

But let's rewind.

Born without a left hand, Baca, an engineer at Sandia National Laboratories, competed for 26 years on the professional racquetball circuit before a knee injury ended his career. Looking for an athletic endeavor to take its place, he settled on golf, which he had tried as a kid but never pursued.

Once he tried it in earnest, he fell in love.

"You can always improve," he said. "Golf is something you can always get better at."

The drive to compete

"I love the mental aspect of competing," he said. "I have a knack for it and when I'm competing it's like a switch is turned on."

With racquetball out of his life, he threw himself into golf and joined a league at Sandia. His handicap index started in the 30s and for a while he was his team's D player. As he practiced and got better, his index came down.

Two years into his new sport, a city worker he knew mentioned that a three-day national amputee golf event was coming to Albuquerque. As a one-arm golfer, he was eligible, his friend told him. He nagged Baca until he finally agreed to enter.

Although he performed so-so, "The competition got to me and I really wanted to start improving," he said.

Later, he competed in a one-arm event in New Jersey. "Those guys were good," he said. "I thought, 'Look what I can become.'"

After returning home, he stepped up the practice and signed up for lessons with a local golf professional, but the relationship didn't work out. "He tried to make me a two-handed golfer," he said. "The experience taught me that I had to figure it out on my own."

If some people are gym rats, Baca is a range rat. What came next was years of relentless practice. He sometimes practiced as many as eight days out of 10. He made huge strides with the quality of his full swing but chipping remained a mystery.

By email, he contacted Jim Flick, a nationally known golf instructor, whose advice was, "Make your biggest weakness your strength."

Baca took Flick's advice. Instead of pounding 400 to 500 balls on the range during each practice session, he started hitting 400 to 500 balls on the chipping green, often at Twin Warriors Golf Club. Soon his short game became so good, the one-arm golfer was able to shoot as low as 79 even when he hit few greens in regulation. "I know I can get up and down," he said.

"My one weakness now is reading greens. If I have a caddie, I'll have 26 to 30 putts a round but without a caddie, I'll have 34 to 36," he said.

One-arm golfer competitions

Over the years, Baca skill as a one-arm golfer took him to the top.

He competed in the National Amputee Golf Association and the National One-Arm Golf Association, and the Paralong Drive Cup.

He was selected to the U.S. team in the Fightmaster Cup, a fully sponsored Ryder Cup-style event in which the best one-arm golfers from the North America compete against their counterparts from the United Kingdom. Baca competed in Wales in 2008 and again in Kentucky in 2010.

But then his goal changed.

"I became the best one-arm golfer and I set my sights on competing against golfers with two hands," he said.

He got serious about his clubs, went looking for a good set and contacted Ping. His prominence as a one-arm golfer led Ping Golf to invite him to the company's Arizona R&D facility for a day-long fitting session. They tailored a set of irons and woods to his swing. "They arrived two days later, boxes of irons and woods," he said.

Over the years, Baca has progressed through the company's G series from G2s to the G30 line. He goes back to Phoenix year after year to get refitted, he said.

Most recently, Baca enrolled in the Golf Tec swing-analysis and lesson program. In the swing bays of Golf Tec's indoor range at 419 Mountain Rd. NW, he can see instant video replays of his swing and analyze data on ball flight and spin rates.

Working with Golf Tec's director of instruction, Kevin Amhaus, the program has gotten his spin rate down, resulting in longer drives. He periodically has playing lessons with Monty Mills, a Golf Tec instructor.

While the USGA Senior Am qualifier may have slipped through his fingers this year, his goal remains — to win an able-bodied golf tournament. Once again, he's stepped up his practice and playing regimen.

His most recent handicap record at GHIN.com shows he's played 44 rounds this year, 14 of them in tournament play. During golf season, he'll play twice a week and practice three times a week, he said.

You can see Baca's swing at the 8-minute mark of this video of the Paralong Drive World Cup competition in Mesquite, Nev.

Dan Vukelich, editor of New Mexico Golf News, is a member of the Golf Writers Association of America and the Golf Travel Writers of America. Reach him at dan@newmexicogolfnews.com

Second act

Sandia retirees band together to help small businesses with tech challenges

By Nancy Salem

Retirement means different things to different people. To Mike Murphy it wasn't about TV and golf, not after logging 40 years as an electrical engineer in the nuclear weapons program at Sandia. He wanted to put his experience to work.

Murphy, a manager in radar systems and firing sets, postponed retirement once.

DANCING PHYSICIST — Retired Sandia physicist Pace VanDevender, right, talks to Shira Greenberg, left, founder and artistic director of Keshet Dance and Center for the Arts, and her staff. "Pace blows our minds every time we meet with him," Greenberg says. (Photo by Randy Montoya)

"My time frame was to leave around 2001, then 9/11 happened," he says. "There were things going on in the world that I wanted to contribute to. I couldn't quit when we faced those challenges."

He loved his work, and stayed at Sandia until 2009, then continued as a technical consultant. He also traveled and ran, from Albuquerque, his family's cattle ranch in eastern New Mexico.

One day in 2017, he got a call from a former Sandia colleague, Ron Moya, who asked if he could help a local small business, PanMuse LLC, to develop a unique computer-based music system. He didn't hesitate.

"It was right up my alley," Murphy says. "I never wanted to be an idle retiree. I have a lot of knowledge and want to be useful. Helping a small company with a technical problem sounded like the right thing to do."

He gave PanMuse a call.

Wealth of talent, need for help

Moya is a founder of Technology Retirees Economic Catalysts (TREC), established in 2015 to connect Sandia retirees with small businesses that need technical and other expertise. "A lot of intellectual capital leaves Sandia when people retire," he says. "Many of them want to use their expertise to contribute."

TREC was launched when Technology Ventures Corp. (TVC), a tech transfer nonprofit founded by former Sandia operator Lockheed Martin Corp. asked Moya, a retired mechanical engineer, to flesh out an idea he had to engage the Labs retiree community in economic development. Early encouragement came from Todd Hunter, a former Sandia staff member who was TVC's chief financial officer and TREC's first sponsor.

"I called a few of my friends and the ball got rolling," Moya says.

His first call was to electrical engineer Larry Walker, the second to engineer Margie Tatro, then came HR specialist Barbara (BJ) Jones, engineer Art Ratzel, Hal Morgan, who worked in engineering sciences and tech transfer, and Murphy. Along with Hunter, they formed the TREC steering committee and developed a business plan. They built a network in the business community to introduce their service, sense the dynamics and get the word out.

"There's an international concept called encore.org that talks about how, as people retire, there is a wealth of available talent and knowledge and a corresponding need for help in society," Jones says. "How do we marry that? Retirees want to be relevant and give back to the community. When Ron called, I knew I wanted in."

The steering committee is building a list of Sandia retirees willing to consult as volunteers with small businesses. "We're a matchmaker," Morgan says. "When a business needs help, we reach out to the Sandia retiree community and find someone."

A direct link to resources

When TVC closed last year, TREC found a new home and sponsor at the Women's Economic Self Sufficiency Team, or WESST, a statewide nonprofit that offers consulting, training, lending and business incubation to people starting or growing a business. The self-sufficiency team serves thousands of clients a year and offers TREC meeting space, referrals and a website. "We are always looking for resources for our clients, and TREC is a great fit," says Julianna Silva, managing director of the team's Enterprise Center. "We share a lot of the same goals. The alliance gives our clients a direct link to the resources TREC brings to the community."

Under the WESST umbrella, TREC does not have to be a certified nonprofit and is free to provide technical and business support without an administrative infrastructure. TREC volunteers pitch in as consultants, not employees. Their role is advisory, though they've been known to do some soldering or write some software.

"The objective is to keep a company on the right path, not be its forever engineer," Moya says. "And we're easy to work with. We can help almost on a handshake."

Walker says Sandia retirees bring intellectual capital to the small-business community. Volunteers include experts in chemical, electrical and mechanical engineering, computer and materials science, physics and more. "These are people who have spent their careers working with the federal government and entities ranging from the Department of Defense to Goodyear Tire — you name it," he says. "They understand the technology, the financials, the policy."

'I'll take as much help as they can give'

Charles Harb, president of RingIR, an Albuquerque startup operating out of the WESST incubator, is developing a mobile laser-based technology that can immediately detect and identify gases for security, industry or research. His company is working with Sandia retiree Rick Ormesher on digital signal processing.

"I'm a quantum physicist, which is highly theoretical and completely different from RingIR, which is practical," Harb says. "Rick is a professional with a wealth of knowledge. He has helped us immensely, including training our younger engineers. We talk about specific problems and how to deal with them. TREC is a great asset. I'll take as much help as they can give."

Ormesher, who retired two years ago after more than 30 years in radar analysis, says he likes staying engaged without the commitment of a 9-to-5 job.

"Charles needed somebody with my background, and when Ron called, I was happy to lend a hand," Ormesher says. "Starting a company is tough, especially in technology. I can look at their methods and approaches and identify ways to improve things."

Shira Greenberg, founder and artistic director of Keshet Dance and Center for the Arts in Albuquerque, asked TREC for help when she began developing a dance performance that would blend art and science. Her wish was granted in the person of Pace VanDevender, a renowned physicist, Sandia vice president emeritus and former director of pulsed power sciences at the Labs.

"I almost didn't believe it when he walked in the door," Greenberg says. "Who would have thought that we could work with a scientist of his stature on our dance project? It's a unique and rare opportunity and just as amazing as you might imagine. This dream of ours will happen and will be fantastic because of him."

VanDevender enjoys collaborating with the young artists and bringing a new dimension to his work in physics. "It's an entirely new realm and way of thinking but it turns out the creative process is the same in science and dance: preparation, incubation, illumination and implementation," he says. "It's been a terrific experience for all of us."

A different kind of customer

As TREC grows, Moya envisions an organization that is recognized in the small-business and startup communities as an R&D and business resource. He would like to involve retirees from other technical institutions and universities. "Sandia is where we started but membership isn't limited," he says.

"We'd like to be an organization that has helped people with their businesses and given volunteers the satisfaction of knowing they helped," Morgan says.

Ratzel says entrepreneurs are different from normal Sandia customers. "It's interesting work," he says. "I love the idea of giving retirees a chance to stay engaged, see what's going on, dust some cobwebs off the brain and make a difference."

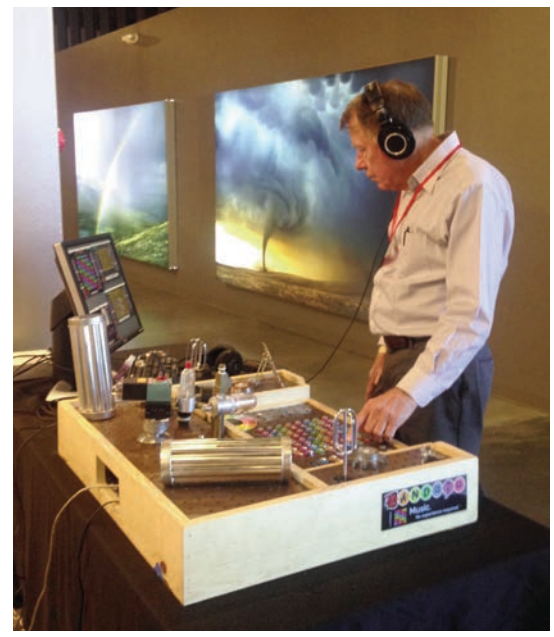
Sandia staff work for a mission-driven organization and bring that drive to retirement, Jones says. "That's who we are," she says. "We're embedded with the notion of exceptional service in the national interest. The desire to contribute doesn't go away with the flip of a switch. We want to have a purpose, have impact."

Hunter says economic development is a new mission for Sandia retirees. "We've invested in this community and want it to be vibrant," he says. "That means something to all of us."

Mary Monson, senior manager of Technology Partnerships and Business Development, says TREC complements Sandia tech transfer efforts and provides a much-needed resource for local small businesses. "Several TREC members were involved in technology transfer at the Labs and continue to be passionate about helping companies succeed," she says.

Join TREC and help a business

Sandia retirees interested in becoming TREC volunteers or in serving on the steering committee can call Ron Moya at 505-856-1245, Larry Walker at 505-294-4087 or Art Ratzel at 505-280-4720. The group also can be reached through its website, nmtrec.org.
Moya encourages Sandians who are planning to retire to join TREC.



MUSICAL ENGINEERING — Sandia retiree Mike Murphy checks the sound at an Albuquerque demonstration of the PanMuse computer-based music system Bandojo. Murphy, an electrical engineer, helped PanMuse create a physical touch-sensing system for the product. (Photo courtesy of PanMuse LLC)

Becoming a better musician

PanMuse, the computer-based musical instrument company, is developing a system that lets people of varying physical and cognitive abilities play music simply by touching a screen. It might show a dinner setting, and music is made by touching goblets, plates, silverware and flowers.

"It's an artful physical interface that is unexpected," says PanMuse Chief Technology Officer Lisa Maynes. "We want to create entire interactive, immersive environments for driving music making."

Maynes is a computer scientist and developed the PanMuse software. But there was no front-end system people could interact with to make the music. Maynes reached out to TREC and got help from Murphy and Walker, both electrical engineers, and manufacturing process engineer Phil Gallegos. They worked with Maynes to create the physical touch-sensing system.

"Larry, Michael and Phil were instrumental in making the capacitive touch-sensing robust," Mayes says. "They worked with us to understand the data filtering algorithms for the touch-sensing, like you'd use on a smartphone screen. They also helped in creating the right grounding and shielding for the systems and adding more filtering to the electronics we provided.

"It was a pleasure and a boon to work with them. They are superbly competent and generous — some of the best people we've ever worked with. Everything they did with us was critical to getting to the stage of manufacturing. We're developing a new business plan that expands the scope of the company and we very much want them to be advisers."

Murphy says it felt good to be part of the PanMuse business. "At Sandia, I was used to working with highly skilled technical people. At PanMuse, they really needed the help in electrical engineering."

And there was a bonus. Murphy for years has played violin and mandolin in an Irish band but had no formal musical training. "Working with them has taught me a lot about music," he says. "I'm a better musician now."

Sandia Gives campaign encourages informed, compassionate giving

SANDIA GIVES

By Katrina Wagner

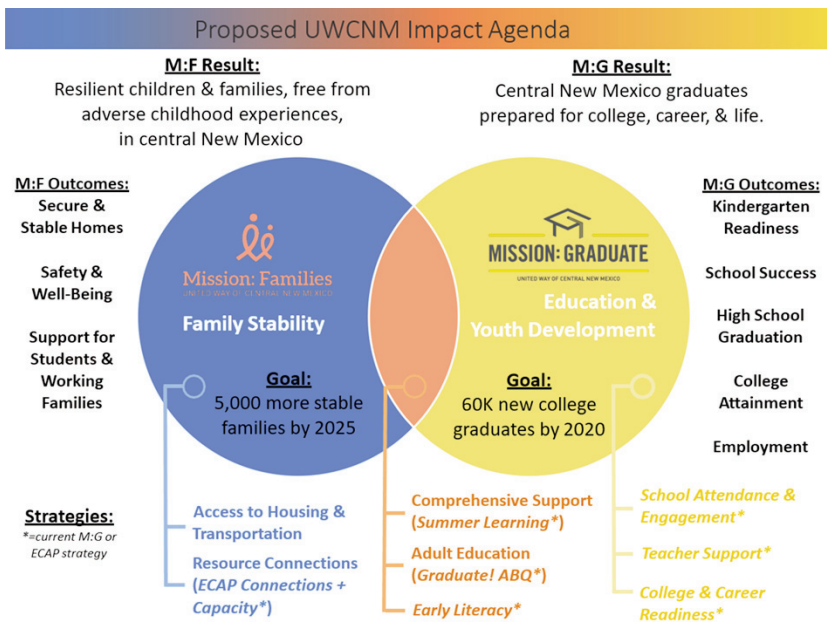
For more than 60 years, members of the Sandia workforce have generously volunteered their time and given money to improve lives and help the local community in profound ways.

The 2018 Sandia Gives campaign will be the first that does not have a set goal for either contribution or participation. Instead, the campaign will provide data and information, inspire compassion, celebrate the past year's contributions and help donors understand how they make an impact on the community.

The best way to help the most people

The United Way of Central New Mexico's Community Fund improves the lives of the most vulnerable people by providing grants to nonprofits in central New Mexico. In 2018, community fund grants supported 82 projects and programs totaling $3 million.

"There are so many nonprofits providing critical services in central New Mexico, but I direct my United Way giving to the Community Fund because I know they've done all the vetting for me and have identified the agencies making the biggest impact," said Roberta Rivera, campaign manager.



The Community Fund helps New Mexicans achieve their potential by supporting programs that focus on education, health, financial stability and basic needs. More than 60 percent of donors give some or all of their gifts to the Community Fund. United Way and volunteers on allocation panels ensure the gifts are invested wisely to support the services most needed in the community.

"During my 36 years with United Way, my wife and I have always contributed at least half of our gifts to support the Community Fund and other programs led by United Way. Combining your gift with more than 16,000 others creates a powerful engine to community change," said Randy Woodcock of United Way Central New Mexico (UWCNM).

"Through two major initiatives — Mission: Graduate and Mission: Families — we're working with several hundred partners to increase our impact and alignment. United Way's community investment is essential to changing lives across central New Mexico," Woodcock said.

Get involved: join a donor group

UWCNM supports donor groups, such as Women United, Young Leaders Society, Guys Give and the Hispano Philanthropic Society, that work to create change in central New Mexico. More than 800 Sandia employees are members of these and other donor groups, and new members are always welcome.

"I am proud to be a part of the Hispano Philanthropic Society for many reasons," says society chair Katie Esquibel of project management. "We have grown a strong partnership with Polk Middle School and will be expanding this year. It is exciting and rewarding to connect with students, learn about their dreams and let them know there is a community behind them that believes in and supports them.

"It has also been wonderful to connect with the educators and families of these students who are so passionate and committed to their students' success," Katie said. "We are also growing our membership community. I love connecting with like-minded people in our community who love New Mexico just as much as I do, and I am honored to be leading the group this year."

United Way Bay Area fights poverty

According to a recent report, Struggling to Stay Afloat — the Real Cost Measure in California 2018, one in three households in California struggles every month to meet basic needs. That's more than 3.3 million families, including those with income well above the federal poverty level.

The United Way Bay Area fights poverty with programs, such as SparkPoint, through which residents receive financial and career coaching along with tax help and food assistance at 21 locations. The program's goal is to help people live more stable lives and take control of their finances. Participants in the SparkPoint program have experienced an average salary increase of more than $800 a month when they attend the program for two years.

The SparkPoint Program is just one way the United Way Bay Area's Community Fund supports residents.

"Last year, I managed a campaign at a local company where the employees' average gifts were less than $800 annually. Together, its employees raised close to $1 million," said Lynda Tolley, United Way Bay Area. "When donors combine their gifts and give back through United Way's Community Fund, we make an enormous impact in the community — more than we can make individually."

BOUNTIFUL HARVEST — Volunteer and Sandia health educator Jenny Thomas loads yellow peppers for delivery at Roadrunner Food Bank. United Way's Community Fund provided nearly 2.8 million meals to those in need, including the nearly 26 percent of New Mexico children considered food insecure. (Photo by Katrina Wagner)

Collective Goods Book Fair

Albuquerque employees can support the Sandia Gives campaign by shopping at the Collective Goods Book Fair:

- Tuesday-Thursday, Oct. 9-11, 10 a.m.-3 p.m., Steve Schiff lobby
- Tuesday-Thursday, Oct. 16-18, 10 a.m.-3 p.m., Steve Schiff lobby
- Tuesday-Thursday, Oct. 23-25, 10 a.m.-3 p.m., IPOC, 2nd floor break room

YARD DAY — Lesley "Sissy" Drain from Sandia's Microsystems Assessments cleans the grounds at New Day Youth and Family Services, which provides shelter and services for homeless youth. New Day's Life Skills Academy received a $51,040 grant from the Community Fund to help youth develop key skills to improve their emotional and social intelligence. (Photo by Katrina Wagner)

United Way's **Community Fund** exists to **help those most vulnerable**.

New Mexico is second worst in the nation for childhood hunger. Through the Community Fund, **2,785,328 meals** were provided to those in need.

United Way SANDIA GIVES October 8–26, 2018 give.sandia.gov

United Way's **Thriving Adults** program **connects struggling individuals with resources** to improve their standing.

Last year, the program provided shelter and supportive services for **7,600 homeless adults**.

United Way SANDIA GIVES October 8–26, 2018 give.sandia.gov

United Way's **Mission: Graduate** goal is to **add 60% new graduates with college degrees and certificates** by 2020.

As of 2016, **Mission:Graduate** has added **20,226 new additional post-secondary graduates** in central New Mexico.

United Way SANDIA GIVES October 8–26, 2018 give.sandia.gov

Celebrating Hispanic Heritage

Crowds enjoy music, dancing, talks at 2018 Hispanic Heritage event

Photos by Lonnie Anderson

More than 500 members of the workforce and Kirtland personnel gathered at Hardin Field for the annual Sandia-Kirtland Hispanic Heritage Month Diversity event, "Family, friends, fiesta through education and awareness." (Clockwise from top left) Dancers from the Public Academy for Performing Arts warmed up the crowd with a dramatic flamenco performance. Later the Al Hurricane Jr. band provided cultural music and got a pair of Sandia leaders steppin' out: Chief Diversity Officer Esther Hernandez and ALD for Mission Assurance Mark Sellers.

The crowd enjoyed delicious food truck cuisine and music from Mariachi Luna Azul. Among the event's speakers were Dan Sanchez of the Sandia Field Office, Col. Juan Alvarez, commander of the 377th Mission Support Group and Bernalillo County District Attorney Raul Torrez, who spoke with Labs Director Steve Younger after addressing the crowd. Members from the Employee Resource Groups participated in the Salsa Challenge and attendees also took part in the Samba Sizzle Latin dance workout and perused a car show.

ALD for Mission Services Scott Aeilts is executive sponsor for event organizers Hispanic Outreach for Leadership and Awareness (HOLA) and the HHM committee.

In case of emergency: Urban Shield 2018

Sandia CaliforniaNews

By Jules Bernstein
Photos by Austin Fausto

Here's the scenario: an anti-government extremist is arrested on a no-bail warrant for driving with a suspended license. His friends meet and decide to issue their own no-bail warrant for a citizens' arrest of the judge who ordered their friend's arrest. The judge fails to arrive at work.

A reliable informant tips off Livermore police that the judge is being held at a compound on the Sandia campus. You and your team have exactly 70 minutes to get as much information as you can about what's happening and safely diffuse the situation. Go.

This was the challenge facing this year's Urban Shield participants. The emergency response exercise is part training and part competition among 35 local, state, national and international SWAT teams. This year's exercise included groups from Hong Kong, the Netherlands, Las Vegas and the California Highway Patrol, along with 31 Bay Area SWAT teams.

Over the course of 48 hours, teams rotated continuously through each of 35 simulated emergency events at locations spread throughout the Bay Area.

John Norden, Sandia California's emergency management coordinator, said Urban Shield is a test of stamina, coordination skills and the ability to think on one's feet.

"The ability to make important decisions has to be as strong at hour 42 of this exercise as it was in the first hour. Hostage negotiations can take a long time, and responders need to be ready the entire time," he said.

The scenario was inspired by real-world events. On Jan. 2, 2016, armed militants seized the headquarters of the Malheur National Wildlife Refuge in eastern Oregon and occupied it until law enforcement made a final arrest 40 days later. The leader of the occupation, Ammon Bundy, had participated in a 2014 standoff at his father's Nevada ranch. Other members of the group were loosely affiliated with anti-government militias and the Sovereign Citizen movement, whose members believe they are not bound by government authority, including courts, taxing entities, motor vehicle departments or police.

This is the third consecutive year Sandia has hosted a scenario in the Labs' community emergency response team fire yard. Urban Shield presented a multilayered training exercise to enhance the skills and abilities of regional first responders, as well as those responsible for coordinating and managing large-scale events. Urban Shield is intended to stretch regional resources so that limits can be identified, while expanding regional collaboration and building positive relationships.

Urban Shield challenges all who participate. It not only improves regional disaster response capabilities, but provides a platform for national and international first responders and the private sector to work efficiently and effectively together when critical incidents occur.

Coordinating with local law enforcement is especially useful for Sandia's Protective Force, according to Norden. "Urban Shield is important for building relationships so that we have a better idea how to work together in case of a real emergency," he said.

This year, event observers named the Las Vegas SWAT team as the top response organization, followed by the Oakland and San Francisco police teams in second and third place, though all teams showed a high level of preparedness.

In addition to the important coordination and response work, the many volunteers who act as victims help make the scenarios feel more realistic. Anyone who wishes to participate in future exercises should contact Norden or members of the emergency management team.

The Contra Costa County Sheriff's team devises their mission plan.

Berkeley police approach the hostage area.

Exercise observers stand in the safe zone.

The University of California Berkeley team suppresses fire from shooters.

Rescued hostages wait in the BearCat armored vehicle.

A shooter preps for the next arriving responder team.

The Contra Costa County Sheriff's team prepares for the drill.

Mileposts

New Mexico photos by Michelle Fleming

California photos by Randy Wong


Bob Benner 35


Anthony Chavez 35


Jenny Gilbride 35

Recent Retirees

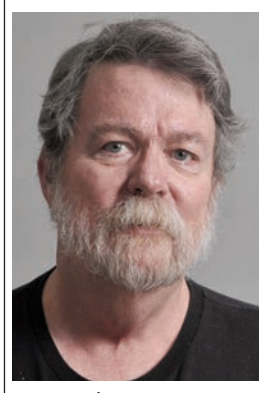

Diana Perea 38

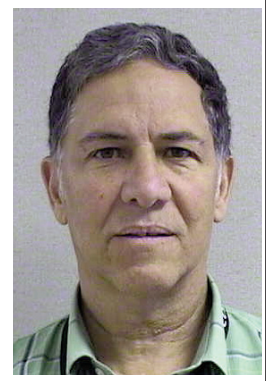

Cindy Kajder 35


Pat Griffin 30


Grant Heffelfinger 30


Russell Miller 30


Tom Souther 38


Alejandro Pimentel 34


Declan Rieb 30


John Vonderheide 30


Marie Miller 25


Tina Nenoff 25


Janise Baldo 28

Retiring and not seen in the Lab News pictures:

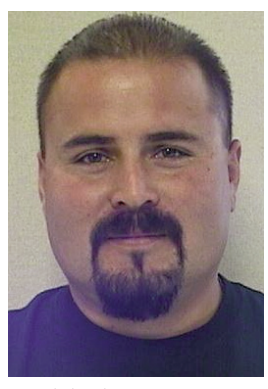
Merrie Rockwell, 35 years

Debra Buttry, 27 years


Darrell Armstrong 20


Wu-Ching Cheng 20


Natasha Genson 20


Dominic Kittredge 20


Paul Kotula 20

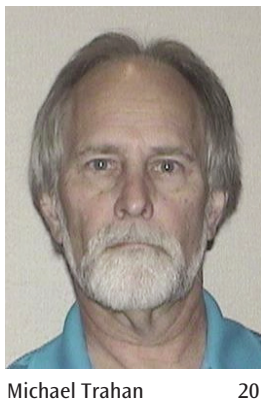

Darick Lewis 20

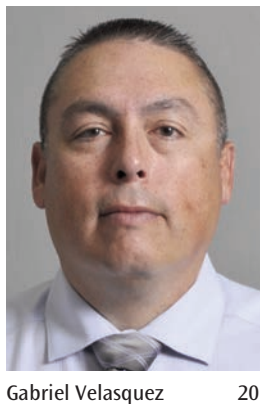

Steve Lindsay 20


James Majors 20


Kathy Pierson 20


Michael Spoerner 20


Michael Trahan 20

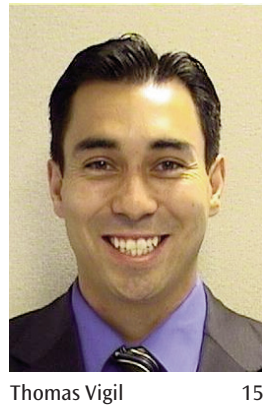

Gabriel Velasquez 20


David Baca 15


Kenneth Bernier 15


Christy Gilbert 15


Jennifer Miller 15


Thomas Vigil 15


Trent Yocom 15

SANDIA CLASSIFIED ADS

MISCELLANEOUS

"HOLIDAY TRADITIONS," CELTIC COLLECTION CDS, set of 3, limited edition, Compass Productions, boxed, pristine condition, $9. Wagner, 505-504-8783.

SPINET PIANO, small upright, needs to be refurbished, free. Holman, 505-281-0755.

DINING TABLE, w/4 chairs, solid oak, extendable, round, located in the East Mountains, $650. Willmas, 505-281-9124.

LAWNMOWER, Honda, powered rear wheel drive, w/bag, used, $125. Hennessey, 505-506-7936.

EXERCISE BIKE, Schwinn 240 recumbent, little used, good condition, $175. Bumstead, 505-220-9201.

SHELVING UNITS, 7 shelves, metal, 18" x 12" x 70", slotted, back/side braces, nut-bolt, garage use/bookcases, 3 available, $15 ea. Achyuthan, 505-216-1858.

NHT SURROUND SOUND SET UP, 6 speakers, center channel, 2 sub woofers, receiver, $4,000 OBO. Prock, 505-261-7932.

LOFT BED, twin over full, w/chest of drawers, bookshelf, honey-colored pine, good condition, $300. Anaya, 505-235-4224.

SCANDINAVIAN FESTIVAL, Nov. 3, 10 a.m.-4 p.m., Immanuel Presbyterian church, 114 Carlisle SE, folk art, dancing, food, free. Richard-Franco, 505-294-5739.

ROUTER, Sears 315, bits, table, adapter plate, manuals, https://tinyurl.com/y94e5bgw, $80. Thompson, 505-292-2877.

CHINA HUTCH, cherry, 7' x 5' x 17", interior lighting, perfect condition, $5,000 new, asking, $3,000 OBO. O'Keefe, 505-321-3103.

VINYL LP COLLECTION, $175/all or $5 ea.; AIWA stereo, speakers, turntable, CD, cassette tape, $75; stereo stand, $10. Kaplan, 505-270-7425.

PICKUP TRUCK COVER, originally for '12 F350, crew cab, probably fits others, w/storage bag, $50. Elliott, 505-792-1002.

RECLINERS, 2, La-Z-Boy, brown leather, $500 ea.; swivel chair, tan, $135; OBO. Fromm-Lewis, 505-220-5772.

KING-SIZE BED, Sleep Number, w/foundation kit, mattress w//adjustable setting on each side, excellent condition, $550 OBO. Montoya, 505-342-0043.

WOOD PELLET STOVE BATTERY BACKUP, w/sealed deep-cycle battery non-spill, $600. Gehrke, 505-263-7327.

FREE TALK, "Feline Gastro-Intestinal Health," Oct. 14, details at http://fabulousfelines.org. Stubblefield 505-263-3468.

CHRISTMAS DISH SET, Farberware, Holiday Snowman, service for 8, w/serving pcs., perfect condition, in original box, Google or call for photos. Murphy, 505-892-0288.

WHEELCHAIR, $100; walker, $50; down comforter, queen, white, slightly used, excellent condition, $200. Drebing, 505-293-3335.

DRIVE MOBILITY SCOOTER, w/basket, used twice, w/charger & manual, have it here at SNL, see at 836/1248. Meyer, kiddlet83@gmail.com.

TRANSPORTATION

'77 MGB, metallic green, wood-grain dash, Tonneau cover, electronic ignition, always garaged, many extra parts, 55K miles. Dukart, 505-296-0155.

'00 SUBARU FORESTER, AT, AC, PW, 210K miles, $2,800. McMahon, 505-944-6511, text or call.

'16 WRX, clean, garaged, Stage 2, built motor, quality parts, 36K miles, $25,000. Martin, 806-206-1739.

'03 CHEVY SILVERADO 1500 2D, regular cab, 5-spd. transmission, completely maintained by mechanic owner, 170K miles, $4,500. Ellis, 505-459-8542.

'07 BMW X3, black, newer tires, 125K miles, great condition, email for photos, $7,500. Mabray, explorerabq@gmail.com.

'07 CORVETTE, atomic orange, single owner, garaged, 40K miles, great condition, $21,500. Jones, 505-238-3336.

RECREATION

TRUCK POP-UP CAMPER, heater gas/electric, sleeps 3, AC, gas cook top, fits 7-ft. truck bed, $3,500. Hibray, 505-821-3455.

'13 FELT AR2, road bike, 51 cm, Ultegra Di2, Fulcrum Racing Quattro wheels, excellent condition, $1,400. Surbey, 505-980-8338.

'17 SURLY KARATE MONKEY MOUNTAIN BIKE, small, hardtail, 29-in. wheels, 2 by, excellent condition, $1,000. Lucero, 505-235-7391.

How to submit a classified ad

DEADLINE: Friday noon before the week of publication unless changed by holiday.

Submit by one of these methods:

- EMAIL: Michelle Fleming (classads@sandia.gov)
- FAX: 505-844-0645
- MAIL: MS 1468 (Dept. 3651)
- INTERNAL WEB: Click on the News tab at the top of the Tech-web homepage. At the bottom of the NewsCenter page, click the "Submit a Classified Ad" button and complete the form.

Questions to Michelle Fleming at 505-844-4902.

Due to space constraints, ads will be printed on a first-come, first-served basis.

'15 HARLEY ULTRA LIMITED, black/chrome, heated grips, security alarm, more, original owner, 10.5K miles, $19,000. Potter, 505-610-9933.

'11 JAYCO GREYHAWK, GPS, 2 flat-screen TVs, rear & side view cameras, 19.5K miles, $65,000. Romero, 505-261-3980.

REAL ESTATE

3-BDR. HOME, 2-1/2 baths, 1,794-sq. ft., South Valley, east KAFB access, large backyard, $169,500. Archuleta, 505-629-6373.

Ad rules

1. Limit 18 words, including last name and home phone (web or email address counts as two or three words, depending on length).
2. Include organization and full name with ad submission.
3. Submit ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. The same ad may not be run more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce, retired Sandians, and DOE employees only.
10. Housing listed for sale is available without regard to race, creed, color, gender, sexual orientation or national origin.
11. Work wanted ads are limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in poor taste.

WANTED

OLD CELL PHONES: Motoroloa StarTAC, early Blackberry, for middle school talks about engineering. Garcia, 505-944-5179, call or text.

Good news for 401(k) participants

By Amy Treece

Sandia participants in the NTESS Savings and Income 401(k) Plan have reason to celebrate.

First, the plan's assets reached $4 billion this year, which the Sandia Investment Team said represents more assets to help participants meet their retirement goals. And even better, the team was able to negotiate lower future expenses on some funds, which saves participants nearly $440,000 a year in fees, based on assets as of June 30.

Just one example of the lower expenses is the Fidelity Contrafund. A share class change in the fund earlier this month decreased the expense ratio from 0.43 percent to 0.38 percent, saving participants an estimated $264,000 a year, based on assets as of June 30.

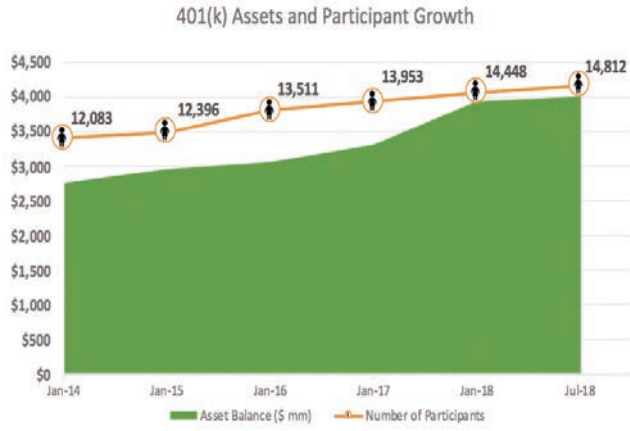
Maxing out the company match

NTESS contributes 2/3 of a dollar for every dollar participants contribute to their 401(k) Plan, up to 6 percent of compensation. Employees are encouraged to maximize the company match by contributing at least 6 percent of their salary to their account. Matching contributions are determined each pay period, and employees can change their contribution rate any time at 401k.com.

Resources abound for investors

Employees can use Financial Engines, an independent advice provider that helps employees learn how to reach retirement and financial goals. Financial Engines, which recently merged with Edelman Financial Services, provides advice and recommendations on the 401(k) plan offerings through its Online Advice service at no cost to participants.

Online Advice is designed primarily for those who have the time and inclination to manage their own accounts. For a fee, Financial Engines also offers ongoing professional management, monitoring and rebalancing of 401(k) accounts for participants who don't have the time, expertise or desire to manage their own retirement accounts and need a customized investment portfolio. To access either option, visit financialengines.com/forsandia.



A reputation for excellence

Last year, Sandia's 401(k) plan received the Best in Class 401(k) Plan designation from PLANSPONSOR Magazine, which rates plans according to a proprietary system of 30 criteria for plan design, oversight/governance and participant outcomes.

PLANSPONSOR Magazine also rated Sandia a Plan Sponsor of the Year finalist in 2016. To be a finalist, retirement plan sponsors must show a commitment to their participants' financial health and retirement success, go above and beyond to help them be retirement ready, use innovative plan designs and provide strong educational strategies.

"We've worked to create a true 'culture of saving,'" said Leah Mitchell, senior manager in investment management.

Leah said that effort led to hiring Financial Engines to provide independent investment advice to all the plan's participants, including active employees, retirees and terminated employees who maintained a balance in the plan.

"Annually, Financial Engines lets participants know if they are on track with their investment allocation, retirement savings and retirement income outlook, and it highlights risks that could impact their goals," Leah said.

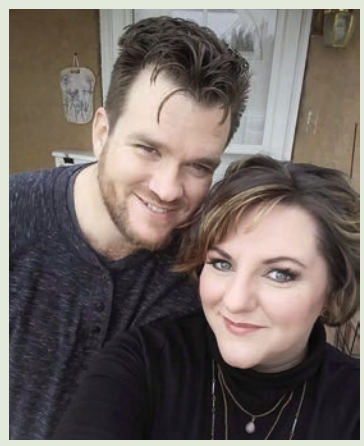
Participant education is paramount, she added, and Sandia offers regular educational classes on such topics as Social Security, Medicare, estate planning, debt reduction, financial planning tools, tax strategies and more.

Sandia family learns to reduce debt for financial wellness

By Myles Copeland

Since her wedding in April, at least one thing has changed for Leandra Tweed and her husband.

"We have new priorities," said Leandra, who works in Sandia's Human Resources. "We want to buy a house eventually, but the main thing that's holding us back from that is our debt."



THE TWEEDS
(Photo courtesy of Leandra Tweed)

Seeking guidance, Tweed attended a presentation titled "Financial Freedom: Strategies for Reducing Debt and Saving More," one of nine different courses offered during Sandia's July Financial Wellness Month.

A collaborative effort between the benefits and investment management organizations, the presentations provided guidance helpful to Sandians with diverse money-related goals, from paying off debt to saving for a home or college to retiring happily. Presented in multiple onsite venues in Albuquerque and livestreamed to California, events drew more than 1,600 attendees.

Finances, stress and health

"Everyone understands 'wellness' as it relates to physical health," said Mary Romero Hart, senior manager for Total Rewards. "Financial well-being is equally as important. Employees can struggle with financial challenges that add stress to life. Dedicating a month to financial well-being helps empower Sandians to better control their financial futures."

For the Tweeds, the education changed behavior.

"The way we'd been reducing debt before was to make a little bit more than the minimum payment on everything," Leandra said. "Now we're doing — they called it a hybrid approach. We're targeting a credit card with one of our highest interest rates and the lowest balance, that we can knock out really quick."

And move one step closer to a new house.

Videos of many Financial Wellness Month presentations are available at hr.sandia.gov, search "Financial Wellness."

Sandia Labs names first Jill Hruby Fellows

Fellowship honors first woman to lead nuclear lab, encourages others to follow her legacy

By Troy Rummler

Mercedes Taylor and Chen Wang are Sandia's first Jill Hruby Fellows. The honorees have each been awarded a three-year postdoctoral fellowship in technical leadership, comprising national security-relevant research with an executive mentor.

Susan Seestrom, chief research officer and associate laboratories director for Advanced Science and Technology, will mentor both Mercedes and Chen.

"Our goal is to provide our fellows with a stimulating opportunity that will allow them to exercise their clear talent and leadership potential," Susan said. "I look forward to them coming on board."

The Jill Hruby Fellowship is meant to encourage women to consider leadership in national security as scientists and engineers. Hruby served as Sandia's director from 2015 to 2017, and was the first woman to lead a national security laboratory. Applications for fellowships beginning October 2019 will be accepted until Nov. 1.

Mercedes Taylor, ion collector

Working as a chemist for the National Institutes of Health prior to graduate school, Mercedes found herself drawn to the idea of a career in government research. "I loved the ability to pursue promising projects regardless of a corporate bottom line while still working in an environment of cutting-edge professional research," she said. Mercedes went on to earn a doctorate in chemistry from the University of California, Berkeley.

ION COLLECTOR — Hruby Fellow Mercedes Taylor will develop new water-purifying materials that capture potentially hazardous ions. (Photo by Phil Bunting)

Her ideal career path, she added, leads to a leadership position at a national laboratory, where she would head research that supports national security and global peace. An opportunity to work at Sandia seemed a perfect fit. "The Jill Hruby Fellowship will give me the chance to establish that career."

Over the next three years, her research will aim to develop new porous plastics that purify water by soaking up ions — electrically charged atoms and molecules — with an emphasis on negatively charged ions, called anions. Materials that can target a particular ion selectively, even in the presence of many other ions, could be especially useful to national security, by identifying chemical warfare agents, radioactive material or harmful natural impurities like arsenic in a water sample. Current technologies to remove various ions from water on an industrial scale leave much to be desired, so the work could also find practical use in desalination plants.

As climate change and population growth are projected to make drinking water scarcer globally over the coming decades, Mercedes hopes her work will provide relief and security.

Chen Wang, soot detective

Chen, who earned a doctorate in materials science at the University of California, Irvine, will begin her fellowship pursuing the understanding of pollution from combustion engine systems to help improve energy efficiency and safety, and reduce environmental impact.

SOOT DETECTIVE — Chen Wang, pictured speaking here, will analyze soot precursor molecules with microscopy and design computational models for cleaner-burning combustion engines. (Photo courtesy of Chen Wang)

To achieve that, Chen will seek to further engineers' understanding of how the smallest particles of soot originate inside a flame. That's a complicated question. A fire is a tangle of physical and chemical changes that feed off each other and often occur simultaneously. Much research in this field, including a new Sandia-led theory recently published in Science, has been conducted by characterizing the mass of particles extracted from a flame. Chen's research will instead capture molecular-resolution images of these tiny particles so she can design computer simulations that model how the particles interact with one other. She will then test her computational predictions at Sandia's Combustion Research Facility in Livermore, California, a specialized laboratory with equipment that can mimic the environment inside an engine.

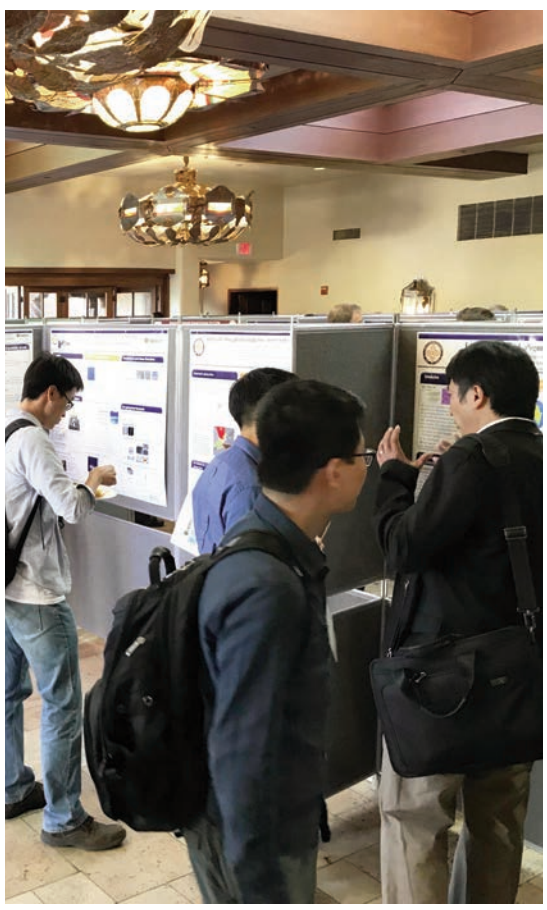
Chen says the Hruby Fellowship will help her continue to encourage public interest in science and environmental issues while promoting the public image of female scientists. As a graduate student and through the Association of Women in Science, she organized science activities for kids and families in downtown Riverside, California. She later expanded to large-scale workshops held at a Discovery Cube children's science museum in Santa Ana, California.

"I saw it as an opportunity to do something more, to build the foundation of what the Hruby Fellowship will become in coming years."

The Jill Hruby Fellowship is supported by Laboratory Directed Research and Development.

Nobel Laureate underscores CINT annual meeting

By Troy Rummler



NANO CONFERENCE — The meeting brought together a diverse community of individuals who use CINT facilities to share their respective research. (Photo by Beth Stelle, Los Alamos National Laboratory)

In 1991, an editor from the Journal of the American Chemical Society directed a paper's author to delete his prediction that the future would hold "intricate molecular assemblies where the components will be designed to receive, store, transfer, and transmit information in a highly controllable manner."

NOBEL KNIGHT — Sir Fraser Stoddart, right, who received the 2016 Nobel Prize in Chemistry, kicked off the conference with a plenary address. (Photo by Beth Stelle, Los Alamos National Laboratory)

Hype, the unimpressed editor called it.

Sir Fraser Stoddart, the author, insisted on keeping the passage, and in 2016, he fulfilled his own prophecy, earning a share of the Nobel Prize in Chemistry for the design and synthesis of molecular machines.

"Sometimes," Stoddart said, "it pays to stick to your guns in terms of what you believe in and not give way to editors and reviewers."

The laureate related the story in a plenary address that headlined the annual meeting of the Center for Integrated Nanotechnologies, which took place Sept. 24-25 in Santa Fe.

This year's conference highlighted research performed by the CINT user community in the areas of quantum materials, nano-mechanics and imaging. CINT is a DOE-funded nanoscience research facility, jointly operated by Sandia and Los Alamos national laboratories, that provides users from around the world with access to expertise and instrumentation with a focus on nanoscience integration.

The sessions on quantum materials attracted the largest crowds. Several talks in that symposium focused on advances in topological materials — a class of materials shown to have unusual properties such as the ability to be a conductor at their surface but an insulator everywhere else.

In a parallel symposium, a striking presentation from Tim Yeh of The University of Texas at Austin demonstrated a technique that tracks single particles through a biological system, which Yeh hopes can be applied to improve drug delivery and to better understand cancer pathways.

The meeting was also an opportunity for CINT staff to update users on the center's new and upcoming capabilities.

Researcher Nan Li, for example, mentioned during his presentation that CINT was working with him to integrate a nano-indenter — a tool used to test mechanical properties such as hardness — into a glove box to enable materials testing in a controlled environment, including the absence of oxygen. Li's collaborator, Brad Boyce of Sandia, then stood up to appeal to the audience. If others would also find this technology useful, he said, they should tell him so he could expedite its development. The integrated tool could be particularly important for lithium-ion battery research, since lithium reacts readily with oxygen.

Coincident with the conference, DOE announced a round of funding decisions, including many in quantum information sciences. At least one researcher, Sergey Frolov from the University of Pittsburgh, celebrated during his presentation that his proposal had been selected.